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EFFECTIVE METHODOLOGY FOR LOCATION MEASUREMENT IN UBIQUITOUS ENVIRONMENT

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ABSTRACT

The Ubiquitous computing is the advance interacting approach, which not only provide one to one communication attribute but also provide multiple collaboration of communication technology. The researchers focus each attribute of ubiquitous environment to enhance the quality of performance, location measurement, configuration management, collaboration of communication and connect actor to use cases. We also focus on maximize the performance in effective ubicom methodology. In this paper we simulate the actual location of node situated in ubiquitous environment at broader level from previous proposed lemma including theorem [1].

KEYWORDS: Ubiquitous Computing, Location Measurement, Communication, Node, Sensor

INTRODUCTION

Ubiquitous means existing or being everywhere, every time for everyone. Computing is any goal-oriented activity. It contain of designing, developing, structuring, and managing various kinds of information making computer systems behave intelligently. System can be defined as an decisive configuration that consists of interrelated and interdependent elements. These elements constantly persuade one another (directly or indirectly) to maintain their activity and the existence of the system, in order to achieve the goal of the system. By Ubiquitous computing we will not only be connected always, from everywhere, but we are approaching a time where smart devices will take actions by predicting user inputs. It is a short distance from mobility to ubiquitous computing [1]. Ubiquitous computing devices are not personal computers, but very tiny -even invisible –devices, either mobile or embedded in almost any type of object imaginable [2]. Location is one of the most important ingredients of user context for ubiquitous computing applications; aiding in inferring additional knowledge about the user such as user movements, social associations, behavior, lifestyle etc. Location measurement techniques form an important part of ubiquitous computing. Because of their ability to determine a user's location which facilitate a variety of ubicomp applications to provide value added services [3].

PREVIOUS WORK

According to Adrian Beldad, Margareta Citra Kusumadewi, location sharing application has mainly two types of benefits of using the app, one is the competence based trust in LSA and other is their trust in LSA network members. Also LSA has a sgnificant impact on social environment [4].

According to Caitlin D. Cot trill, Piyushimita ‘‘Vonu’’ Thakuriah , sharing the data on mobile may also cause primary risks, generally no steps are taken to address these risks, that privacy is impacted by a range of factors which includes both personal and contextual matters such as private information seeking, personal data, private location data that is dependent on a number of factors related to personal characteristics degree of trust in collecting organization [5].

Mu Zhou , Zengshan Tian, Kunjie Xu,Xiang Yu, Xia Hong, Haibo Wu, proposed a system for location tracking called as SCaNME, which repeatedly sequence the clusters of recorded received signal strength measurements and with that it constructly a mobility map which help in location tracking [6].

Abhishek Samanta,Fangfei Zhou , Ravi Sundaram proposed SamaritanCloud, proposed a scalable infrastructure known as samaritan cloud which enables all the personal computing devices which are mobile and geographically dispersed to form a cloud to fulfill the purpose of privately sharing locality specific information[7].

According to Hiam Khoury, Dima Chdid, Raja Oueis, Imad Elhajj,DanielAsmar, proposed a portable, lightweight and cost effective hybrid inertial vision tracking system which provides an accurate precise and robust localijation of mobile users in construction enviroments. It provides an average accuracy of around 1% of the total traveled distance whereas the INsand vision system provides less than 2 % of the total traveled distance [8].

We earlier proposed a theoram for effective ubicom methodology [1]

Th 1= {L1 + L2 + L3}

Where L1, L2, L3 denoting the three Lemmas, for configuration, location measurement and verfication and validation. In this article we focused on lemma 2 to measured the location of node at broader level.

Wireless Network

A wireless communication helps people to communicate among each other without using wires. They can access the information they require, browse the internet, use the application, interact among each other at anytime and any place. There are various types of wireless communication available but this communication takes place with the help of certain computer devices which include personal digital assistants(PDAs), laptops, personal computers(PCs), servers and printers. The information which is being communicated could be of different forms like voice communication, videos, email, text messages, web-pages, database records.

VARIOUS TYPES OF WIRELESS NETWORK

WLAN

Stands for Wireless Local area network, it is type of technology which helps to communicate in a local area such as library, university campus. In this a temporary network can be formed in order to access internet.

WPAN

Stands for Wireless Personal Area Networks, it is type of technology in which two current technologies Infra Red(IR) and Bluetooth are being used for communication within an area of about 30 feet.

WMAN

Stands for Wireless Metropolitan Area Networks, it is type of network which helps in communication between a metropolitan area such as different buildings in a city.

WWAN

Stands for Wireless Wide Area Networks, it is type of technology which helps to provide communication in a wider area such as cities or countries via multiple satellite systems or antenna siteswhich are looked after by an Internet Service Provider.

WI-FI Sensor Network

Wi-Fi Stands for Wireless Fidelity: This technology uses radio frequency that transmit data in the air . It incorporate the frequency division multiplexing. Its intital speed of is a mbps to 2 mbps and transmission of data in the frequency band of 2.4ghz. This technology used in various devices[9].

Ac- Powered Devices*:* To use wireless communication Power consumption is not required.

Rechargeable Devices (Laptops, Smart-Phones): It can be work many days with rechargeable battery.

Battery Powered Devices(Sensor like Smoke Detectors, Motion Detector *):* Devices which have low power that needs to run multiple years with standard batteries..

Comparison

WIFI- Sensors Consumes Low Power: The most important factor depending upon the battery lifetime performance is the compatibility of the low power Wi-Fi chip/module

Sleep Current and Wake up Energy: Certain events may leads to transition to active state, only when Wi-Fi sensor stayin sleep state for most of the time.

Transmit and Receive Energy: WIFI allows the sensor to spend very low amount of time for transmission and reception with very minimal power consumption. Agricultural environmental are such example of wifi sensor network.

WIRELESS AD-HOC NETWORK

It is a distributed autonomous sensor which are used to monitor environmental condition like sound, pressure, temperature, etc. It also transfer the the collected data to a main location for information. Wireless Ad-hoc sensor network are basically those type of scenarios in which sensor are spread across a wide area range (i.e. spread in vast geographical area).

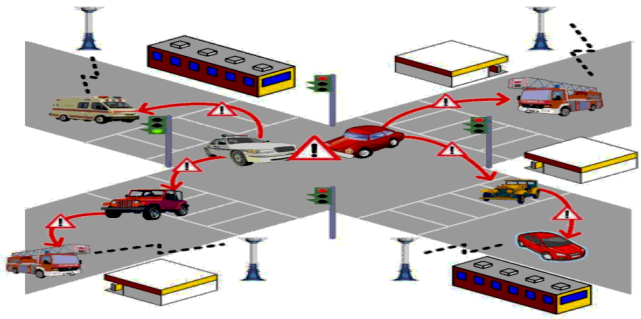

Figure 1: Adhoc Network[10]

Some of the ad-hoc sensor network examples are as follows:

- A Millta sensor network which could detect any movement of energy or some kind of explanation and capture and pass the information to the main location.
- Wireless traffic sensor network are used to monitor the vehicle traffic on highway or intercity road connectivity.
- Some sensor network to capture the information related to environmental changes such as in plains, forests , oceans etc
- Wireless parking lot sensor network which are useful in identifying the occupied and free areas / spots.

Ubiquitous computing is a technology which is basically used to provide services to the people anytime, anywhere. In other terms we can say that it is a 24 by 7 help facility provide to users. The user could be a mobile user or a static user. The uses or functionality of this technology could be explained clearly with the help of three simple scenario which this technology supports.

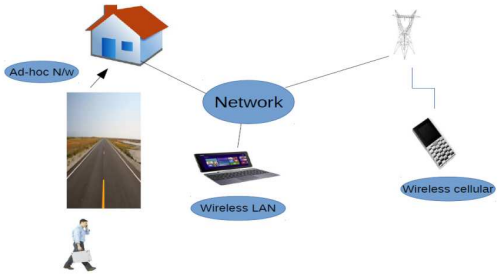

Figure 2: Wireless Network

Scenario 1

If a person is travelling in his car on a highway road then with the help of ad-hoc network they can easily access the information which he requires. Or could get anytypes of helps anytime at anyplace. This type of user is a mobile user which can take the advantage of this technology 24 by 7.

Scenario 2

At home or any work place if we want to communicate between two or more devices like for example to transfer some data from one pc to another pc or to broadcast a common message from one system to multiple system then we can used Wireless LAN technology which helps us to provide 24 by 7 communication between various distributed system.

Scenario 3

Ubiquitous computing technology also helps us to provide communication between different cellular networks, with the help of wireless cellular technology

SIMULATION RESULT

We consider two sim(Sim1,Sim2) for sense out the location parameter of node via different topologies. here the random selection will performed for each node to catch out the position of sensing node via the network size, topology & processing time.

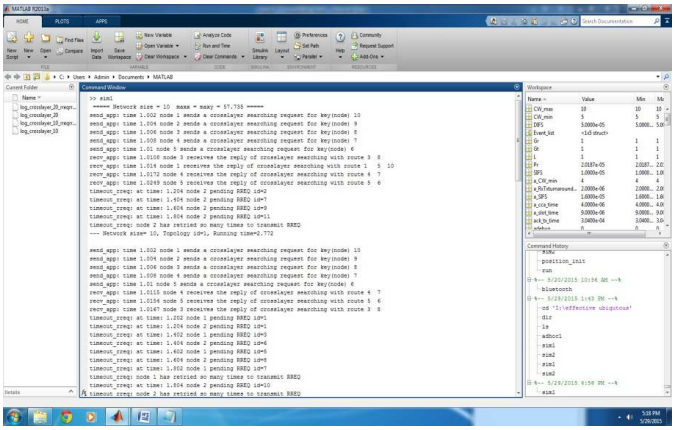

Figure 3

Here we have taken

Network size(n) = 10

maxx = sqrt(100*100*n/30);

where n= number of nodes.

maxx = maxy = 57.735

Send application showing that node 1 sends a crosslayer searching request for node 10 at the time 1.002, similarly node 2, node 3, node 4 and node 5 sends a cross layer searching request to node 9 , 8, 7, 6 respectively at different time. At receiver side, node 3 receives the reply of crosslayer searching with route 3 8 at the time of 1.0108. Similarly node 1,4,5 receive the reply of crosslayer searching route 1 5 10, 4 7 & 5 6 respectively. But node 2 did not get the reply of crosslayer , in other word the reply request time is over and its send to pending state. So we can conclude that generate network topology 1 requires 2.772 seconds to complete the process.

If use generate network topology 2, the sending application are continuing as in topology 1, but the receiver side application will be modified as node 4 receives the reply of crosslayer searching with route 4 7 at the time of 1.0115. Similarly node 5 & 3 receive the reply of crosslayer searching route 5 6 & 3 8 respectively. But here node 1 & 2 did not get the reply of crosslayer , in other word the reply request time is over and its send to pending state. So we can conclude that generate network topology 2 requires 1.928 seconds to complete the process.

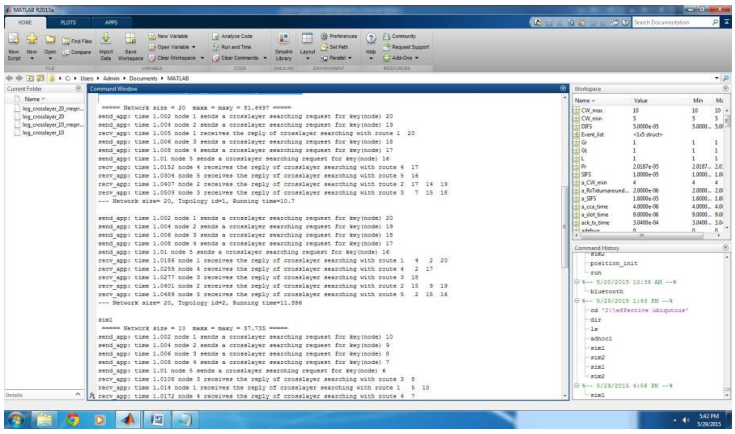

Figure 4

Here we have taken

Network size = 20

maxx = maxy = 81.6497

Send application showing that node 1 sends a crosslayer searching request for node 20 at the time 1.002 and node 2 sends a cross layer searching request to node 19 at time 1.004. At receiver side, node 1 receives the reply of crosslayer searching with route 1 20 at time 1.005 . Similarly node 3, 4 and 5 sends a crosslayer searching request for node 18,17 and 16 at time 1.006 ,1.008 and 1.01 respectivley. At receiver side node 4,5, 2 and 3 receive the reply of crosslayer searching with route 4 17 , 5 16 and 2 17 14 at time 1.0152, 1.0304 and 1.04074 respectively. So we can conclude that generate network topology 1 requires 10.7 seconds to complete the process.

If use generate network topology 2 ,node 1, 2, 3, 4 and 5 sends a crosslayer searching request for node 20,19, 18, 17 and 16 at time 1.002, 1.004, 1.006, 1.008 and 1.01 respectively. At receiver side node 1, 4, 3, 2 and 5 receives the reply of crosslayer searching with route 1 4 2 20, 4 2 17, 3 18, 2 15 9 19 and 5 2 15 16 at time 1.0186, 1.0259,1.0277, 1.0401 and 1.0489. So we can conclude that generate network topology 2 require 11.386 second to complete the process.

Sim 2

n = 30;

maxx = 100;

maxy = 100;

Maximum speed = 1

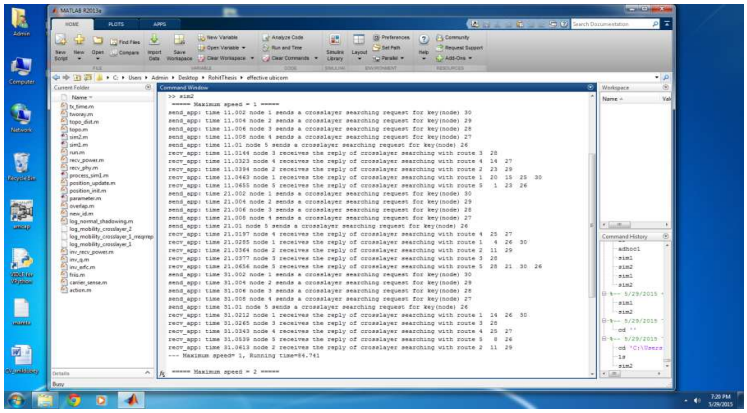

Figure 5

Sending application shows that node 1, 2, 3, 4 and 5 sends a cross searching request to node 30, 29, 28, 27 and 26 at time 11.002, 11.004, 11.006, 11.008 and 11.01 respectively. At receiver side node 3, 4, 2, 1 and 5 receive the reply of crosslayer searching with route 3 28, 4 14 27, 2 23 29, 1 20 15 25 30 and 5 1 23 26 respectively. Again, node 1, 2, 3, 4 and 5 sends a request to node 30, 29, 28, 27 and 26 at time 21.002, 21.004, 21.006, 21.008 and 21.01 respectively. Again, at receiver end node 4, 1, 2, 3 and 5 receive the reply of crosslayer searching with route 4 25 27, 1 4 26 30, 2 11 29, 3 28 and 5 28 21 30 26 at time 21.0197, 21.0285, 21.0364, 21.0377 and 21.0656 respectively.

Again, sending application shows that node 1, 2, 3, 4, 5 sends a crosslayer searching request to node 30,29,28,27 and 26 at time 31.002, 31.004, 31.006, 31.008 and 31.01 respectively. Again, at receiver end nodes 1, 3, 4, 5 and 2 receive the reply of crosslayer searching with route 1 14 26 30, 3 28, 4 25 27, 5 8 26 and 2 11 29 at time 31.0212, 31.0265, 31.0343, 31.0539 and 31.0613 respectively. So we can conclude it take 84.741 second as running time to complete the process.

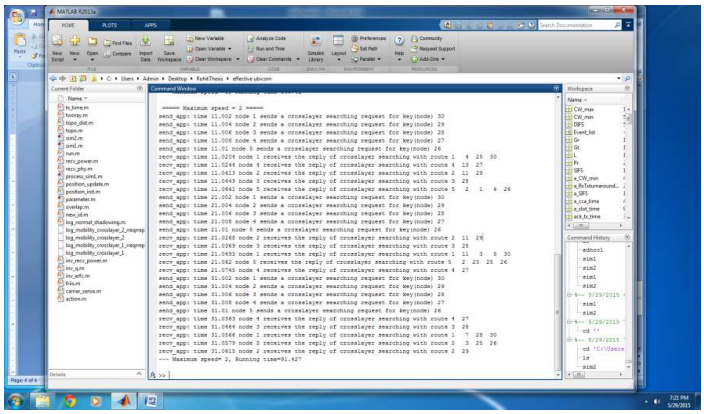

Figure 6

Sending application shows that node 1, 2, 3, 4 and 5 sends a cross searching request to node 30, 29, 28, 27 and 26 at time 11.002, 11.004, 11.006, 11.008 and 11.01 respectively. At receiver side node 3, 4, 2, 1 and 5 receive the reply of crosslayer searching with route 3 28, 4 14 27, 2 23 29, 1 20 15 25 30 and 5 1 23 26 respectively. Again, node 1, 2, 3, 4 and 5 sends a request to node 30, 29, 28, 27 and 26 at time 21.002, 21.004, 21.006, 21.008 and 21.01 respectively. At receiver end , node 2, 3, 1, 5 and 2 receives the reply of crosslayer searching with route 2 11 29, 3 28, 1 11 3 5 30, 5 2 26 25 26 and 4 27 respectively at different time. Again, sending application shows that node 1, 2, 3, 4, 5 sends a crosslayer searching request to node 30,29,28,27 and 26 at time 31.002, 31.004, 31.006, 31.008 and 31.01 respectively. Again at receiver end node 4, 3, 1, 5 and 2 receives the reply of crosslayer searching with route 4 27, 3 28, 1 7 28 30,5 3 25 26 and 2 29 respectively at different time. So we can conclude it take 91.427 as a running time to complete the process.

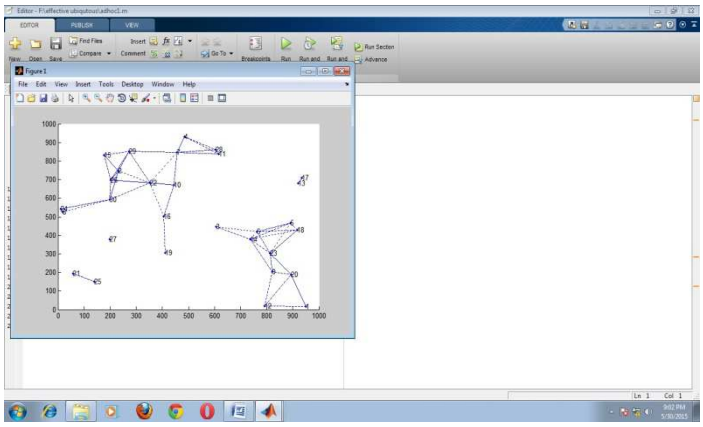

Figure 7

We have considered 30 nodes in our ubiquitous environment and locating the position parameter of each nodes via random selection for both direction of location, x, y.

We plot the graphical representation of located nodes: x location, y location according to their distance from another node. A relationship is formed to show the connection of each node to other node.

CONCLUSIONS & FUTURE SCOPE

Communication services are simulated via Matlab and result represents the actual behaviour of nodes in dynamic state of affairs, the location of each node is determine via location parameter of xloc, yloc in both ad-hoc and wireless condition. The wireless communication services used in ubiquitous environments are deploying for 30 nodes at different location and request/ response service to perform communication of one node to another node in random fashion. We repeat the process after some interval and result we get is similar to as we get earlier, this proof that this process is accurate. We also invite to deploy the wireless communication technology at greater level using wireless network to increase the range of ubiquitous environment that support 24 by 7 communications.

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